

The Impact of Human Resource Management Practices in Manufacturing Organizations in Taiwan

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I Introduction

We had talked about how the Human Resource Management (HRM) practices improved in Taiwan in my conceptual framework which was published in the *Journal of Business & Accounting Review*. As noted earlier, my two main research questions are: (1) Determine the extent to which HRM systems directly enhance the human capital performance; (2) Analyze the moderating effects of employee' creativity, turnover rate, and tacit manufacturing knowledge on the relationship between HRM systems and human capital performance in Taiwan's manufacturing.

In order to do this research, I use a conceptual framework (Figure 1) derived from the studies discussed above as the core framework that explain the relationship between HRM practices and firm performance. In this model, I examine the impact of HRM practices on four HRM practices: (1) Employee' creativity; (2) Turnover rate; (3) Tacit manufacturing knowledge; (4) Human capital performance.

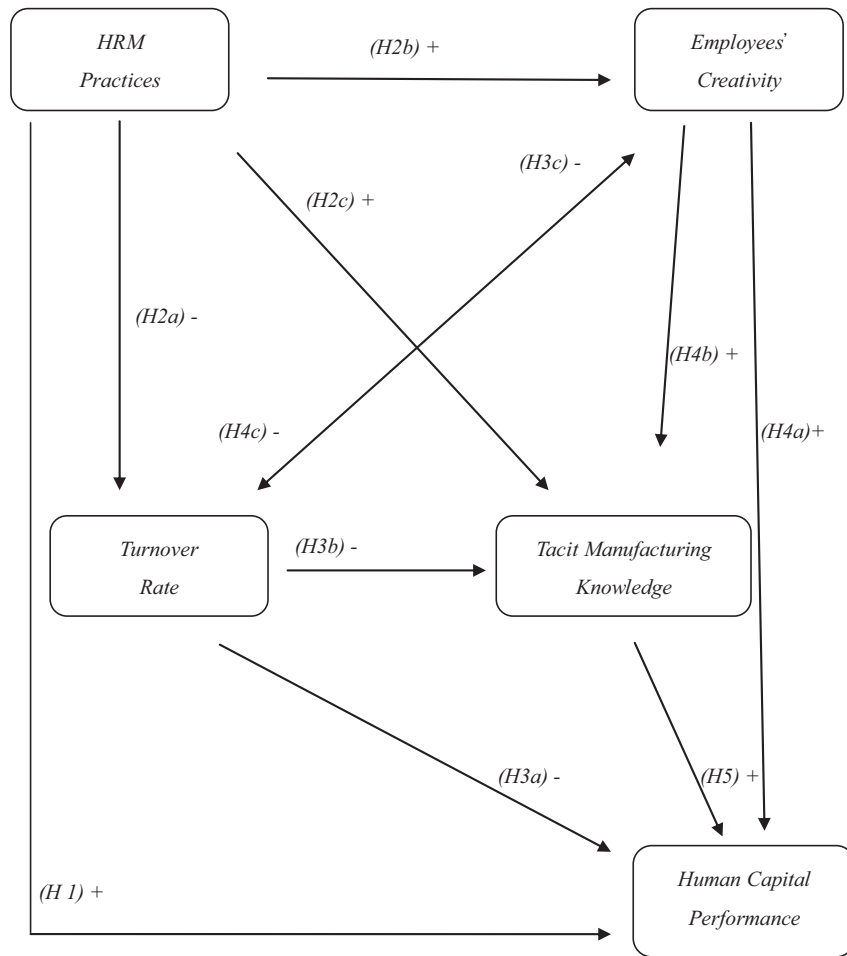
Moreover, it is not difficult to discover that each dimension has the alternative positive or negative relationships and are interrelated with each other (Figure 1). From hypothesis 1, it can be easily observed that the HRM practices are positively related with human capital performance. From hypothesis 2b and 2c, the HRM practices have positive relationships with both employees' creativity, and tacit manufacturing knowledge. However, for the hypothesis 2a, HRM practices are negatively related with turnover rate. From both the hypothesis 3a and 3b, the turnover rate has a negative relationship with both tacit manufacturing knowledge, and human capital performance. From hypothesis 3c, the turnover rate is negatively associated with employee' creativity. From hypotheses 4a and 4b, employee' creativity has positive relationship with human capital performance, and tacit manufacturing knowledge. Conversely, from hypothesis 4c, the dimension of

employee' creativity is negatively related with turnover rate. From hypothesis 5, tacit manufacturing knowledge is positively related with human capital performance.

With these conceptual framework and perspectives in mind, I will conduct this research with my empirical data.

Figure 1 General Conceptual Framework with Hypotheses

The Hypothesized Positive or Negative Relationships between HRM Practices and Human Capital Performance.



Symbol Explanation: (1) +: Positively related; (2) -: Negatively relate.

II Methodology

1 Method

I analyze these data in detail, to examine the reason that certain firms still survive up to date without obvious technology innovation. This study explains whether the strategic HRM activities of these firms might be a main factor for why those firms are still surviving after thirty years.

In order to conduct this study, I designed a cross-sectional survey questionnaire which included structured questions and semi-structural questions.

In Taiwan, there are thirty-nine standard screw manufacturing firms. I interviewed thirty-one of them, which means I covered 79.49% of the standard screw manufacture population.

In my study, I asked our sample firms to provide data for three time periods: three years prior to the practice of a new HRM system; the year of adopting or improving the new HRM system; and three years after adopting the new HRM systems. Specifically, the data I asked for includes the workers' number of production lines, amount of firm productivity per month, on individual productivity per month, the turnover rate, the percentage of tacit manufacturing knowledge, numbers of new ideas and suggestions, and the numbers of official, outsource, of-fice, and production line employees.

In addition to those data regarding the time periods, I also asked about their compensation systems for non-experienced and experienced employees at the time of establishment of the company and compare to now, the type of quality control system they are adopting, and the most appropriate proportion between the new HRM system and new manufacturing equipment, if they are to make an assumption.

In this study, I will use the Resource Based View (RBV) as my central theory to conduct this research. As noted before, HR has been treated as an invisible asset to an organization. An organization cannot manufacture products without their human capital. This is why I adopted the Resource Based View (RBV) as the central theory of this study.

In my analysis of the survey, I also asked for the organization's opinions regarding this issue. For this part, I needed their personal opinion and judgment on how they feel about certain HRM practices. To support their observations and opinions, I also asked for specific

figures (pre, during, and post) as evidence.

2 Sample Firms and Interviews

There are many different types of screws, including high technical and standard ones. In selecting our sample firms, I have chosen the traditional standard screw manufacturers. I can examine how the HRM systems affect them and what their productivities are.

These traditional standard screw manufacturers are still manufacturing similar products to those from thirty years ago, and are still profitable, in spite of the emergencies of competitors in low cost economics. I believe the reason is that their current HRM systems are better than before and keep them improving and developing. Before selecting my sample firms, I control for the three following conditions:

- (1) The business has to have started before 1991;
- (2) They have to be 100% standard screw manufacturers;
- (3) They have to be located in Taiwan regardless the exact region.

With these perspectives in mind, I have selected sample firms from the Industry of Taiwanese Screw Association. Overall, there are thirty-nine standard screw manufacturing companies in Taiwan; twenty-nine of them are located in the southern part of Taiwan, six of them are located in the middle part of Taiwan, and four of them are located in the northern part of Taiwan.

For the location of our sample firms, five are located at the middle part of Taiwan and twenty-six are located at the southern part of Taiwan. For those sample firms located in the middle part of Taiwan, they are located in the:

- (1) Chuansing Industrial Park (全興工業區);
- (2) Changhua Coastal Industrial Park (彰濱工業區).

For those sample firms located in the southern part of Taiwan, they are located in the:

- (1) Benjhou Industrial Park (本洲工業區);
- (2) Yongan Industrial Park (永安工業區);
- (3) Houshun Industrial Park (後鄉工業區).

Before conducting interviews with these sample firms, I contacted them through telephone and mail to explain to them the purposes and the kind of data I would need. I also asked to interview both the managers of Human Resource and Production Departments. Unfortunately, eight firms refused to be interviewed or fill out a mail survey. As a result, I

have interviewed thirty-one sample firms total, and this is about 79.487% of all the standard screw manufacturing firms in Taiwan.

The way that I collected the data was by interviewing the managers of both the Departments of HR and Production in each company. In this questionnaire, I would need the data regarding HRM systems and Production. Normally, there are two way of collecting data: mailing the survey or conducting an interview. For our questionnaires, it would be more efficient for us to conduct actual interviews with our sample firms.

3 Definitions and Measurements

(1) Independent and Depend Variables:

- **HRM Practices.**

Definition: In this study, I select the recruiting and selecting, training and compensation as the main HRM practices that I would like to examine. I understand that there are other HRM practices that can be discussed, however, according to our pre-research, these standard screw manufacturing firms do not have other HRM practices out of these three. This is why I only discussed about the recruiting and selecting, training and compensation as the main HRM practices in this study. Each one of these practices is related directly to my three variables which will be discussed in this research. I will use these three practices to exam how they affect our sample firms and the variables of this study.

Measurement: Initially, I was planning to ask the amount of companies investing in the HRM practices and how it affects the employees' creativity, tacit manufacturing knowledge, and the turnover rate. This can be measured by the proportion of their annual budget of these three HRM practices. To do this, I intended to ask the inter-viewee to provide the annual budget of these three HRM practices to be our data base.

However, In the process of doing these data collection interviews, the managers refused to provide us any information about their financial situations. Therefore, I asked them about the percentage of how they change or improve in the HRM practices of recruiting and selecting, training and compensation.

- **Turnover rate.**

Definition and Measurement: Companies spend enormous amounts of money and

resources in their attempts to retain their top employees for their work force.

In this study, the turnover rate will include the employees who have left the job regardless of whether they have left voluntarily, or by organizational decision. In addition, I do not take organizational and age level of turnover rate into consideration. However, those employees who left for retirement or accident and injuries on the job will not be included.

In this research, I will adopt the numbers of turnover rate that are offered by the interviewed sample firms. The turnover rate could be monthly, seasonally or annually.

- **Employees' Creativities.**

Definition and Measurement: Creativity is defined as the development of ideas, outcomes, products, or solutions that are judged as (a) original and novel and (b) appropriate and potentially useful for the situation (Shalley, Zhou, & Oldham, 2004; Zhou & Shalley, 2003). Moreover, almost all definitions of creativity involve the concept of usefulness and appropriateness as well as novelty (e.g., Amabile, 1996; Sternberg & Lubart, 1996; Zhou, 2003). In this study, I define creativity as new methods, new ideas, new thinking, and new improvements to production or suggestions both for organizational entrepreneurship and manufacturing. As an example, the General Manager from firm 3 pointed out that there might have been some suggestions to use other metal compound to produce screws instead of steel that will in turn increase the strength intensity of the screws and allow it to have a wider application. However, the company did not produce screws in that way because they do not have that kind of customers that would demand this type of screws and they are tired of developing new screws also.

As part of the questionnaire data collection process, I asked the interviewed organizations to provide the numbers of suggested and adopted ideas. However, the sources of these ideas are not part of my consideration.

- **Tacit Manufacturing Knowledge.**

Definition: Tacit knowledge is the work-related practical know-how that is acquired through direct experience and instrumental in achieving goals important to the holder (Wagner & Sternberg, 1985).

Tacit knowledge is defined as the working procedures, operation steps, or

experience about how they judge the products by appearances which cannot be written, and have to be learned by doing or taught by an experienced worker, senior employees, through on job training (OJT), or learning by doing (LBD).

As a result tacit knowledge is the proportion of a work task that cannot be written, but learned from OJT. In our questionnaire, I will ask our responder about what is the proportion of the tacit manufacturing knowledge control in their work.

For examples, 40% of A-work can be learned by paper reading like operator rules, and 30% of A-work has to be learned from an experienced worker, and other 30% of A-work has to be learned by on job training (OJT), then 60% of A-work is defined as tacit knowledge.

By asking the managers how much their employees learned from the manual book and how much they learn from on job training (OJT) and learning by doing (LBD), and by asking how much on job training (OJT) and learning by doing (LBD) can be divided into personal experience and/or taught by senior operators. I include both the on job training (OJT) and learning by doing (LBD) here.

Measurement: In this study, I had the percentage of tacit manufacturing knowledge provided by our sample firms. I asked firm 1 to measure their tacit manufacturing knowledge. It was defined as those problems or questions that cannot be solved or taught from the employee manual books; rather the knowledge needs to be answered by experienced employees or senior employees. Therefore, the percentage they provided was also the percentage of tacit manufacturing knowledge. During the data collecting process, some general managers pointed out specifically what the tacit manufacturing knowledge is. These could include the working sound of the manufacturing equipments, or identifying the quality of the screw to be whether good or bad just from the appearance of the screws.

- **Human Capital Performance.**

Definition: In this research, the financial performance is not the major concern. It would be better to determine human capital performance by measuring their output per employee. Thomas (2000) argued that people possess innate abilities, behaviors, personal energy, and time. These elements make up human capital the

currency people bring to invest in their jobs. He also argued worker, not organizations, owns the human capital. Workers, not organizations, decide when, how, and where they will contribute it.

In this research, human capital performance is defined as organizational output. I will need this data for the examination under the previous HRM systems and the new HRM systems.

Measurement: I will adopt the data provided by the interviewed firms for the output of an organization or the average employee productivity. Moreover, there will be three different kinds of data:

- (1) The output or productivity before adopting new HRM system;
- (2) The output or productivity during adopting or improving new HRM system;
- (3) The output or productivity after adopting new HRM system.

With these data of productivity and numbers of manufacturing employees, I can easily understand the productivity of each firm.

(2) **Control Variables:**

In this study, I have set control variables in conducting this research:

- **The Year of Establishment of the Business.** Businesses with longer operating history always have higher market share than the younger businesses even if they have the same size. In this study, I would also like to investigate how these sample firms can still survive and make profit 20 years later by producing similar standard screws as always. In establishing this controlled variable, our sample firms have to be in the business at least 20 years ago. In other words, our sample firms had to have started their business before 1991.
- **Nationalities of Employees and Firms.** This study does not take the nationalities of employees and sample firms into consideration. The sample firms I chose are all located in Taiwan. Most of Taiwan based organizations would choose to hire foreign labors in order to decrease their wage expense. Most of the foreign labors came from China and Southeast Asia (to date, the nationalities of those labors includes Indonesia, Thailand, Vietnam, and Philippine). Therefore, the policies differ with the proportion of Taiwanese and foreign workers. I assume their policies are perfectly made for those employees whom belong to their firms. Similarly, the nationalities of investors are not being taken into consideration

either. Whether the company is invested in by foreigner or the locals is not a concern here as well. For the companies that are based in a foreign country, yet invested in by locals will not be part of this research data base also. Only data from those firms that are located in Taiwan will be collected.

- **3 Years as a Period of Time.** I chose the sample firms that are in the business for at least 20 years (had started their business before 1991). They are 100% standard screw manufacturers. In controlling this variable, those firms who produced high-tech screws usually have lower productivity and efficiency than those standard screw manufacturers. In order to match up with the same amount of productivity as the traditional manufacturing firms, these high-tech manufacturing firms will require more time and manufacturing knowledge to be able to do so.

Although from the very beginning up until now, those companies may have had major changes or improvements on HRM system and/or manufacturing equipment, I would like to examine how the most recent HRM systems affect the pre and post employee productivity. This is the reason why I decided to use 3-year as a term for each before, during, and after phase.

It will also be difficult to collect data that is over 10 years old because these traditional Taiwanese screw manufacturers almost never keep their commercial record for more than 10 years.

In the questionnaire, although I set 3 years as the base line, it does not mean I only select those sample firms that matches our questionnaire form. I have also prepared additional tables to collect data from those samples firms which do not fit the profile.

Basically, I will be asking our sample firms to provide as much data as they can, but it should be at least 3 years in length.

- **Three Stages of Time Periods.** Three time periods: For the time periods of data, I would like to ask our interviewees to provide the data in three periods of time:
 - (1) Average index of three years before the new HRM are practiced;
 - (2) Average index of one year or three years during the new HRM are practicing (it depends on the year of practicing new HRM practice);
 - (3) Average index of three years after the new HRM are practiced.
- **60% of HRM System & Manufacturing Equipment.** In this research, I am looking

for substantial changes in the HRM system and in capital equipments. I define substantial to be a over 60% changes in the policies, procedures, and practices related to HRM compared to the current HRM system. This is a self reported measured based on the interviewees' knowledge of the HRM system.

Likewise, for capital equipment change, I am looking for substantial change in the form of additions to/or modification to the production equipment or lines currently in use and use the 60% award as our guide.

For our sample firms, they focused on their HRM systems on recruitment and selection, training, and compensation.

The firms provided us with the percentage of the changes that has occurred. It was measured by the number of practices that had changed. For example, firm 5's data showed 100% change and improvements in their HRM systems. They explained in detail that regarding the previous recruitment and selection process, they did not hire the employees based on their school background, but on their passion and willingness to learning. This applies to both the non-experienced and experienced employees, however, with the new system, they ask the applicants to have at least some education background on mechanical or electrical knowledge. The reason behind is that they want to hire employee with some academic knowledge, thus increasing the intellectual minds inside the plant.

For the training part, they also pointed out that they only allow one experienced employee to lead two to three non-experienced employees when producing.

- **Firm Size and Production Lines.** In this study, I do not control the firm size or their capital amount. In our questionnaire, I asked the sample firms to provide the numbers of production lines for our three stages of time, the numbers of offices and manufacturing employees. This way, I can understand the individual productivity of each sample firms. Firm size is less of a factor in that all firms are considered small median enterprises.
- **Firm Products.** There are many different kinds of screws, including high technical and standard ones. In selecting our sample firms, I choose those firms that only produced 100% standard screws. I can examine how the HRM systems affect them. Besides, those firms who produced high-tech screws have lower productivity than those standard screw manufacturers.

- **Problems of New or Old Manufacturing Equipments.** In this research, the new manufacturing equipment means the equipment has been changed or improved over 60% in a certain period of time.
- **Outsource Employees.** The numbers or proportions of outsource employees. The outsource employees may be more productive than official employees, and with lower pay than official employees also. From an employer of an organization's point of view, hiring the outsource employees can reduce the time and cost on their training program. It can also reduce the cost of HRM system by hiring those outsource employees. In general, with the same number of employees and manufacturing equipments, organizations who adopt the outsource employees system may have a higher profit than the other organizations.
- **Human Capital Performance.** In this study, I define the human capital performance as the productivity. If I know the total output of manufacturing employees, and then I can easily understand the output per employee. The formula to find out the average employee productivity is "Tons/ Number of manufacturing employees".

4 Questionnaires

Since there is insufficient information about Taiwanese manufacturing in Japan, I choose to collect the data of Taiwanese manufacturing firms by having either interviews or mailing surveys. For the interview, I have designed three questionnaires for the managers of HR and Production Departments.

I have designed three forms of questionnaires to collect the data:

- (1) About official employees;
- (2) About outsource employees;
- (3) Unofficial (Optional) Questionnaire.

The questionnaire about official employees is targeted toward the official employees of our sample firms. In this questionnaire, I would like to know how their HRM practices and Human Capital Performance changed over time. There are four sections in this questionnaire. In the first section, I focused on their structural and HRM systems. Questions include when this company was established, their manufacturing strategy, new and old HRM systems, numbers of their office and outsource employees, numbers of

production lines, and the problem of publicly or privately held company. In the second section, I focused on the time points concerning the HRM systems. Questions include the percentage of changes in their systems and the time for latest changes and the time and frequency of changing or improving of their manufacturing equipment. The third section is the survey questions which I also ask for the data of pre, during, and post. In this section, I adopted the Likert scale to let those General Managers to choose how they feel by circling. Those questions include their feedback on the new HRM practice, employees' creativity, tacit manufacturing knowledge, productivity, and turnover rate after the new HRM systems are established. I also asked them to provide data to support their perspectives. In addition, I also asked their opinion and how they felt about new HRM system and new manufacturing equipment. The fourth section is the comment section.

The questionnaire about outsource employees was designed for our sample firms who have outsource employees in their company. The purpose of this questionnaire is to understand the structure of outsource employee and how they affect this company. There are two sections in this form of questionnaire. The first section is about the history of adopting outsource employees, any HRM practices for outsource employees, where they put these outsource employees in, and is there any training programs for these outsource employees. The second section is the survey questions comparing outsource and official employees.

For the unofficial (optional) questionnaire, I design this form for our sample firms to provide their financial situation. The purpose of this questionnaire is to understand if they paid attentions on improving their HRM practices, and the percentage they invested in them. In this section, I asked about the annual budget of investment in HRM, the company income and net income, and the capital amount.

5 Interviews with the Sample Firms

Upon interviewing with the thirty-one sample firms, I learned that that they do not separate the position of the HR and Production Managers. In other words, they combined the work scope for the managers of HR and Production as one, the General Manager. Below are some of the reasons they decided to do this:

(1) To save the expense for the two departments. Since the firm is medium to small in size, there is no clear reason to keep these two departments separately;

(2) They delegated the responsibility of recruiting employment to the General Manager since he/she should understand both the departments of HR and Production the best, thus would be able to make the most appropriate decisions when hiring new employees for the company;

(3) It would be easier for stock holders to hold the General Manager responsible if something happened due to hiring the wrong or unproductive employees.

For the official employee's questionnaire, our sample firms are willing to answer all of the questions and provided as much data as they could. However, they refused to provide information about each year other than the average numbers of employees, production lines and manufacturing equipments. One reason that they refused or would not provide us the detail data is because these types of information are very important commercial secrets. They cannot take the risk if these detail data went out to their competitors. According to them, another reason is that they are only minor enterprises and they do not want to be noticed by anybody.

For the outsource employees questionnaire, none of the sample firms used outsource employees in their office or manufacturing lines. Most of the people usually believe that using outsource employees should be an easy way to reduce labor cost. This way, companies may not need to spend for selection, training program, welfare, and so on. Contrary to public belief, our sample firms saw this differently. Instead of lowering the cost, adopting the outsource employees might have an opposite effect because there might be problems with quality and management of outsource employees. They told us that the biggest difference between the official and outsource employees is their loyalty to the company. All of these sample firms agreed that loyalty is the most important attitude in working for a company. Same principle applies; these sample firms do not outsource their products to lower the cost either. They do all their manufacturing in their plants. There are three reasons that they do this to decrease the cost:

- (1) To decrease the transportation expense;
- (2) To decrease all the costs that the upstream firms can get from them;
- (3) To have better sale prices than their competitors, and higher market share rate.

For the unofficial (optional) questionnaire, all the sample firms refused to answer about any financial situation. The reason is that none of them are published publicly. They do not wish anybody or employees outside the circles of stock holder to know any information

about their financial situations.

During our data collection interviews, some General Managers provided data of the three time periods from their memories. They stated that the company does not keep this kind of record for such a long period of time. Even if they do, they would not be able to show it to us. In explaining so, the interviewers chose to believe they are providing the real numbers. For the rest of the General Managers, they wanted us to wait for them to find out and calculate it for us.

III Examinations of Hypotheses and Results

In this study, we collected data by asking opinions, numbers and percentages from those General Managers of our sample firms. Specifically, we have two kinds of data: Likert scale and questionnaire data. In this section, I will use those collected data to examine all my hypotheses. The distinguish I use for examining these hypotheses to determine if they are strongly supported is when 70% of percentage either strongly approve or approve with the questionnaire data of Likert scale and the other data is in the predicted dissention of the hypotheses.

1 Likert Scale and Questionnaire Data

(1) Hypothesis 1: HRM practices are positively associated with human capital performance.

In this research, I hypothesized that the HRM practices can affect the human capital performance positively. We would like to examine the assumption using the Likert scale and questionnaire data. In the data of Likert scale, twenty-three (74.20%) General Managers strongly agreed with my assumption, four (12.90%) General Managers agreed and four (12.90%) General Managers had a neutral opinion. From the data provided, it can be seen that the average numbers of individual productivity increased gradually over the three periods of HRM system change. The average numbers of individual productivity for before, during, and after are 13.86 tons, 14.96 tons, and 21.12 tons. After examining these numbers, Hypothesis 1 is strongly supported.

(2) Hypothesis 2a: HRM practices are negatively associated with the turnover rate.

I hypothesized that the HRM practices can affect the turnover rate negatively. According to the Likert scale data, ten (32.26%) General Managers strongly agreed with this point, ten (32.26%) General Managers agreed, and eleven (35.48%) General Managers had a neutral opinion. From the data provided data, it can be seen that the average number of turnover rate decreased gradually over the three periods of HRM system change. The average percentages of turnover rate for before, during, and after are 3.87%, 3.26%, and 1.35%. After examining these numbers, Hypothesis 2a is supported.

(3) Hypothesis 2b: HRM practices are positively associated with employee' creativity.

I hypothesized that the HRM practices can affect the employee' creativity positively. According to the Likert scale data, twelve (38.71%) General Managers strongly agreed with this hypothesis, twelve (38.71%) General Managers agreed and seven (22.58%) General Managers had a neutral opinion. From the data provided, it can be seen that the average numbers of provided thoughts, suggestions, or ideas increased gradually over the three periods of HRM system change. The average numbers of provided thoughts, suggestions, or ideas for before, during, and after are 8.35, 12.52, and 22.19. Not only that, the average numbers of adopted thoughts, suggestions, or ideas also increased gradually. The average numbers of adopted thoughts, suggestions, or ideas for before, during, and after are 3.23, 6.42, and 15.39. After examining these numbers, Hypothesis 2b is strongly supported.

(4) Hypothesis 2c: HRM practices are positively associated with tacit manufacturing knowledge.

I hypothesized that the HRM practices can affect the tacit manufacturing knowledge positively. According to the Likert scale data, twenty-three (74.19%) General Managers strongly agreed with this hypothesis, seven (22.58%) General Managers agreed and one (3.23%) General Manager had a neutral opinion. From the data provided, it can be seen that the average proportion of tacit manufacturing knowledge increased gradually over the three periods of HRM system change. The average percentages of tacit manufacturing knowledge for before, during, and after are 3.74%, 9.95%, and 20.77%. After examining these numbers, Hypothesis 2c is strongly supported.

(5) Hypothesis 3a: Turnover rate is negatively associated with human capital performance.

I hypothesized that the turnover rate is negatively associated with the human capital performance. According to the Likert scale data, nineteen (61.29%) General Managers strongly agreed with this hypothesis, eight (25.81%) General Managers agreed and four (12.90%) General Managers had a neutral opinion. From the data provided, we can understand that the turnover rate decreased after the new HRM practices were practiced and the average number of individual productivity increased gradually over the three periods of HRM system change. The average numbers of individual productivity for before, during, and after are 13.86 tons, 14.96 tons, and 21.12 tons. After examining these numbers, Hypothesis 3a is strongly supported.

(6) Hypothesis 3b: Turnover rate is negatively associated with tacit manufacturing knowledge.

I hypothesized that the turnover rate is negatively associated with the tacit manufacturing knowledge. According to the Likert scale data, twenty-four (77.42%) General Managers strongly agreed with this point, six (19.35%) General Managers agreed and one (3.23%) General Manager had a neutral opinion. From the provided data, we can understand that the turnover rate decreased after the new HRM practices were practiced. The average numbers of turnover rate for before, during, and after are 3.87%, 3.26%, and 1.35%. Further, the average proportion of tacit manufacturing knowledge increased gradually over the three periods of HRM system change. The average percentages of tacit manufacturing knowledge for before, during, and after are 3.74%, 9.95%, and 20.77%. After examining these numbers, Hypothesis 3b is strongly supported.

(7) Hypothesis 3c: Turnover rate is negatively associated with employee' creativity.

I hypothesized that the turnover rate is negatively associated with the employees' creativity. According to the Likert scale data, nineteen (61.29%) General Managers strongly agreed with this point, eight (25.81%) General Managers agreed and four (12.90%) General Managers had a neutral opinion. From the data provided, we can understand that the turnover rate decreased after the new HRM practices were practiced. The average percentages of turnover rate for before, during, and after are 3.87%, 3.26%, and 1.35%. Further, the average numbers of provided thoughts, suggestions, or ideas increased gradually over the three periods of HRM system change. The average numbers of provided thoughts, suggestions, or ideas for before, during, and after are 8.35, 12.52, and 22.19. The average numbers of adopted thoughts, suggestions, or ideas also increased

gradually over the three periods of HRM system change. The average numbers of adopted thoughts, suggestions, or ideas for before, during, and after are 3.23, 6.42, and 15.39. After examining these numbers, Hypothesis 3c is strongly supported.

(8) Hypothesis 4a: Employee' creativity is positively associated with human capital performance.

I hypothesized that the employee' creativity is positively associated with the human capital performance. According to the Likert scale data, twelve (38.71%) General Managers strongly agreed with this hypothesis, thirteen (41.94%) General Managers agreed and six (19.35%) General Managers had a neutral opinion. From the data provided, we can understand that the average numbers of provided and adopted thoughts, suggestions, or ideas increased gradually after the HRM practices were practiced. The average numbers of provided thoughts, suggestions, or ideas for before, during, and after are 8.35, 12.52, and 22.19. The average numbers of adopted thoughts, suggestions, or ideas for before, during, and after are 3.23, 6.42, and 15.39. In addition, the average number of individual productivity also increased gradually over the three periods of HRM system change. The average numbers of individual productivity for before, during, and after are 13.86 tons, 14.96 tons, and 21.12 tons. After examining these numbers, Hypothesis 4a is strongly supported.

(9) Hypothesis 4b: Employee' creativity is positively associated with tacit manufacturing knowledge.

I hypothesized that the employee' creativity is positively associated with the tacit manufacturing knowledge. According to the Likert scale data, fifteen (48.39%) General Managers strongly agreed with this hypothesis, ten (32.26%) General Managers agreed and six (19.35%) General Managers had a neutral opinion. From the data provided, we can understand that in the area of tacit manufacturing knowledge, the average numbers of provided thoughts, suggestions, or ideas increased gradually. The average numbers of provided thoughts, suggestions, or ideas about tacit manufacturing knowledge are 3.71, 6.32, and 12. Further, the adopted numbers of thoughts, suggestions, or ideas also increased gradually over the three periods of HRM system change. The average numbers of adopted thoughts, suggestions, or ideas about tacit manufacturing knowledge are 0.77, 2.81, and 7.87. These together showed that the average proportion of tacit manufacturing knowledge increased gradually after adopting the provided thoughts, suggestions, or ideas

over the three periods of HRM system change. The average proportion of tacit manufacturing knowledge after adopting those provided thoughts, suggestions, or ideas are 3.16%, 9.35%, and 20.19%. After examining these numbers, Hypothesis 4b is strongly supported.

(10) Hypothesis 4c: Employee' creativity is negatively associated with turnover rate.

I hypothesized that the employee' creativity is negatively associated with the turnover rate. According to the Likert scale data, seven (22.58%) General Managers strongly agreed with this hypothesis, nineteen (61.29%) General Managers agreed and five (16.13%) General Managers had a neutral opinion. From the data provided, we can understand that in the area of turnover rate, the average numbers of provided thoughts, suggestions, or ideas increased gradually over the three periods of HRM system change. The average numbers of provided thoughts, suggestions, or ideas about turnover rate are 2.35, 3.32, and 6.23. Moreover, the adopted numbers of thoughts, suggestions, or ideas about turnover rate increased gradually over the three periods of HRM system change. The average numbers of adopted thoughts, suggestions, or ideas about turnover rate are 0.84, 1.87, and 4.06. These together showed that the average proportion of turnover rate decreased gradually after adopting the provided thoughts, suggestions, or ideas over the three periods of HRM system change. The average proportion of turnover rate after adopting those provided thoughts, suggestions, or ideas are 3.84%, 3.23%, and 1.23%. After examining these numbers, Hypothesis 4c is strongly supported.

(11) Hypothesis 5: Tacit manufacturing knowledge is positively associated with human capital performance.

I hypothesized that the Tacit manufacturing knowledge is positively associated with human capital performance. According to the Likert scale data, twenty-seven (87.10%) General Managers strongly agreed with this hypothesis, three (9.67%) General Managers agreed and one (3.23%) General Manager had a neutral opinion. From the data provided, we can understand that the proportion of tacit manufacturing knowledge increased gradually after the new HRM practices were practiced. The average percentages of tacit manufacturing knowledge for before, during, and after are 3.74%, 9.95%, and 20.77%. In addition, the individual productivity increased gradually over the three periods of HRM system change. The average numbers of individual productivity for before, during, and after are 13.86 tons, 14.96 tons, and 21.12 tons. After examining these numbers,

Hypothesis 5 is strongly supported.

2 Summary

In this research, we understand that the HRM practices of recruitment, selection, training, compensation, turnover rate, employees' creativity, and tacit manufacturing knowledge affect the human capital performance either directly or indirectly. After the examinations, I found that the recruitment and selection, training, and compensation affect the human capital performance positively. Not only that, the HRM practices of recruitment and selection, training, and compensation affect the employees' creativity and tacit manufacturing knowledge positively. One aspect there HRM system affects negatively is the turnover rate. The turnover rate affects the employees' creativity, tacit manufacturing knowledge, and human capital performance negatively. The employees' creativity affects the tacit manufacturing knowledge and human capital performance positively, but affects the turnover rate negatively. The tacit manufacturing knowledge affects the human capital performance positively.

After our examination of hypotheses, using Likert scale and questionnaire data, we found out that Hypotheses 1, 2b, 2c, 3a, 3b, 3c, 4a, 4b, 4c, and 5 are in the category of "strongly supported" and Hypothesis 2a is in the category of "supported".

IV Conclusions and Implications

1 Results and Implications

From the above discussions of my study, I am proposing that one of the reasons that traditional Taiwanese manufacturing organizations can survive and be profitable results from improvements in their HRM systems that influence one of their most important resources that is the employee.

Organizational tacit knowledge has a very great influence in a knowledge-base industry. For the Taiwanese manufacturing, the strategy that they cared about and made is to increase the quality of product, productivity of labors through the tacit knowledge of employees. In other words, a firm's tacit knowledge is related to a firm's organizational

capability. As outlined in figure 3, it is important to understand that the issue of tacit knowledge is crucial for Taiwanese manufacturing and should be well examined.

Central to my thinking is the importance of the relationship between a firm's overall strategy and its HRM practices. From this key relationship, I posit that when a firm tends to increase the intensity of their HRM practices, it will also increase the intensity of employee' creativity. As a result, the proportion of turnover rate will decrease. With the resulting proportion of turnover rate decrease, I expect that the intensity of tacit manufacturing knowledge will increase. Consequently, the human capital performance will go up.

In this study, I choose to adopt the RBV and cost strategy to help understand and explain on how these Taiwanese traditional manufacturing organizations have survived up to now and how they will meet future challenges.

Human capital can be seen as an invisible asset of an organization. It affects how the organization runs their business and makes a profit. Making the best use of their human capital is a very serious and important topic for all of the enterprises to discuss. This is why all the enterprises pay attention on developing their HRM systems. They urge their employees to perform most productively and efficiently. From the owner's point of view, he/she would like to ask his/her employees to generate higher profit than the employees' compensation. In doing this way, they can increase the organizational profit.

In this research, I agreed that the HRM practice of recruitment, selection, training, compensation, employees' creativity, and tacit manufacturing knowledge did help the traditional standard screw manufacturers to increase their productivities. These HRM practices are also the main factors that allowed them to survive through the ups and downs of financial crisis. Although they are traditional manufactures, the standard screws are still in big demand whether in automobile, furniture, or building industries.

There are many scholars that had their data base on major enterprises, but these are not suited for minor enterprises. Especially, there are very a few research literatures that discussed about the standard screw manufacturing organizations in Taiwan. These minor enterprises produced with small, low cost, limited capital amount minor enterprises. Moreover, they are still manufacturing almost the same product screws as thirty years ago with profit. I believe that these traditional standard screw manufacturers still survive today because of their continuous HRM systems improvements. Although they still

produce with backward technological manufacturing equipments, they can still make profit and contribute to society. Our sample firms also spent a lot of time bonding and developing good relationships with their employees. This is why their turnover rate is low and they were able to keep their tacit manufacturing knowledge inside the company. They understand it takes time and expenses to train new employee from juniors to capable seniors with experience. One obstacle they need to overcome is the aging group of the employees. Less and less people from the younger generation are willing to join this industry. This is a huge gap that these traditional manufacturing firms need to overcome.

2 Strength and Weakness

We understand that HRM practices can improve productivity and maintain the survival rate. These sample firms only represent 79.49% of all the standard screw manufacturers' ecology. We do not know if this model will be suitable for the other industries or even in the high-tech screw manufacturers. Therefore, there are rooms for scholars to continue future studies.

(1) **Sample Selection.** In this research, I only discussed about the traditional standard screw manufacturers. HRM practices of these traditional standard screw manufacturers were the main discussion topic. However, I expect to have a chance to study the high-technology screw manufacturers also. We understand these high-technology screw manufacturers will need more financial basis, manufacturing knowledge, and quality control systems to manufacture a high-tech screw. As we know, the high-tech screws are used in computers, cameras, televisions, even the aircrafts, satellites, and space ships. It will require very precise QC systems when producing these screws in order for them to meet the requirements for those electronic devices, where accuracy is the key. I believe it will be very valuable in this area. Future researches can include studies on other kind of industries in examining how the HRM practices influence each company, as well as evaluating the impact on the outcome and results.

(2) **Firm Locations.** In this research, I only discussed the firms that are located in Taiwan, which are only thirty-nine firms. However, there are more traditional screw manufacturers in China and South-East Asia. As we know, the living and labor costs in China and South-East Asia are much lower than in Taiwan. Therefore, their standard screws may have higher competitive advantages than Taiwan's standard screws. This is

why I believe that discussing these traditional screw manufacturers that are located in China and South-East Asia will be a topic worth research about in the future.

(3) **Time Factor.** For future research, they should expand the time period to study how the performances relate to HRM practices. In this research, the examined time period is approximately seven years. We focused on those three years before the new HRM were practices, the year during the new HRM practices were implemented, and three years after the new HRM practices were in use. In reality, the database is not enough for a deeper analysis. It would also be difficult to ask these traditional screw manufacturers to offer those data in detail. Future researchers may focus on the average data from their start-up date to today, and the improving frequency of their HRM practices.

(4) **Employee Manual Book.** In this research, I did not mention the frequency these sample firms upgraded their employee manual book. In fact, I believe the employee manual book can be a significant standard to examine how their tacit manufacturing knowledge improved.

(5) **The Ecology of the Screw Industry.** During our sample selection process, we only found thirty-nine standard screw manufacture firms from the Association of Screw Industry. However, the numbers of standard screw manufacturers when this industry just started, number of companies that went bankrupted, and numbers of companies which morphed into other industries could not be found. I believe it would also be valuable to research these data and take them into consideration.

3 Suggestions

In this research, we understand that the HRM practices did play an important role in increasing the productivity of the firms. In addition, it can also increase the loyalty from the employees. We can also believe that with the increasing proportion of tacit manufacturing knowledge, the employees could have better operational procedures in produce and judging the screws. With these in their mind, the efficiency and productivity of these firms will also increase.

4 Concluding Statement

In this study, we discussed how the HRM practices of recruitment and selection, training, compensation, employee' creativity, turnover rate, and tacit manufacturing knowledge

affect the productivity of the standard screw manufacturers. Through data collection interviews, I realized that these firms may not understand the official name of Human Resource Management, but they understand that they should take care of their employees and make their lives better.

In conclusion, following are some of the reasons that these standard screw manufacturers still survive today and are making a profit:

- (1) They use the Cost Strategy as their manufacturing strategy.
- (2) Their employees did not apply for overwork pay.
- (3) Their employees are loyal to their companies and productive.
- (4) These General Managers have good and tight relationships with their employees.

Overall, these standard screw manufacturers survived because they continued to improve their HRM systems and their performances were either directly or indirectly affected by these HRM practices. We also understand that the employee is the most important resource in a company.

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